

# The "It's All In The Numbers" Math System

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for use in:

- Skip Counting
- Addition
- Subtraction
- Learning Place Value
- Multiplication
- Division
- Equivalent Fractions
- Adding of Like and Unlike Fractions
- Mixed and Improper Fractions
- Fraction and Percent Equivalents
- Fraction and Decimal Equivalents
- Fractions, Percentages and Decimals
- Money Equivalents
- Factors
- Number Ladders (Positive & Negative Numbers)
- Secondary Math Curriculum

## **Instructions:**

The All-In-The-Numbers Math System can work for anyone wanting to learn or refresh their math skills. Both use simple manipulative sheets of numbers that can be cut into strips and slid into an optional base unit. The Teach Strips have panels that can be colored and cut to make Teaching Strips using standard width sentence strips and the sheets themselves can be used as testing devices similar to bingo (cross out all numbers that equal  $6+4$ ,  $7 \times 5$ , etc). To keep costs down everything is available in plain white and on standard paper. Information on this page are suggestions on usage.

## **You can print the following materials:**

A 1-108 Factor and Prime Number Chart  
Factors and Prime Numbers Worksheets  
Place Value Worksheets  
Number Ladder Worksheets

## **The basic student learning kit could include the following materials that you print and cut into strips:**

1 Red Sheet (1-625 multiples labeled 1-25) with Test Strips 1-7  
1 Yellow Sheet (1-625 multiples labeled 1-25) with Test Strips 8-14  
1 Blue Sheet (1-25 repeating labeled 1-25) with Test Strips 15-21  
1 Green Money Sheet with Test Strips 22-25  
1 White Color In Fractions, Decimals and Percentages Sheet  
1 Multi-Colored Fractions, Decimals and Percentages Sheet  
1 Pink Factors to 60 Sheet  
1 Orange Positive and Negative Number Sheet (Vertical)

## **The Teacher's Instructional Kit could include:**

Patterns to make:

25 Maroon Strips (1 set of 1-625 Multiple Teaching Strips)  
2 -- 1-25 Navy Teaching Strips  
1 set Green Money Teaching Strips  
1 set Multi-Color Fractions, Decimals, Percentages Teaching Strips  
1 color-coded Fractions, Decimals and Percentages Chart  
    (1) 1-108 Factors Chart  
    (1) 1-108 Factors Worksheet  
A Place Value Reproducible Worksheet  
A Number Ladder Reproducible Worksheet  
Software Programs

### **Using an Optional Base Unit**

The base unit I have has four slots. The top two slots are used when doing basic addition, subtraction, multiplication and division. The bottom two slots are used when comparing different fractions with similar or different denominators plus mixed fractions. The bottom two strips can also be used with the fraction, decimal and percentage strips as well as the money comparison strips.

### **All Strips are also available Un-Colored**

So you can have your class color them as desired. With the high cost of printer ink, I gave you this option. It also lets you colorize according to your style or use the Teaching Strips as a lesson itself. Student colors  $\frac{1}{3}$  red and then another colors 33% red, or .33 red, etc.

### **Skip Counting or Multiplication: (Red or Yellow)**

**Use one slot.** Place one strip (Red or Yellow) in the top slot and start counting. **Note:** Post-its can be used to cover Teaching Strip numbers during classroom use to see if students are learning. I refer to Multiplication as “Quick Addition, Power Addition OR Speed Addition”

### **Addition: (Red or Yellow or Blue)**

**Use two slots.** Place one strip (Red OR Yellow) in the top slot and another strip (Red, Yellow or Blue) in the second slot and add the numbers that line up. **Note 1:** Grade K – 3: use strips Red1-15 OR Yellow1-15 and Blue1-15 to do basic addition by 1's, 2's, etc. Grade 4 – 6: use strips (1-25) as desired depending on one, two or three digit addition. **Note 2: Teachers** Addition and subtraction using one of the blue strips – The lowest number on top strip added to the answer to the previous problem is the answer to the current problem. Addition using the Red and Yellow Strips – Answer to the first problem plus itself is the answer to the second problem AND the first answer plus the answer to the previous problem is the answer to the current problem.

### **Subtraction: (Red or Yellow or Blue)**

**Use two slots.** Similar to Addition above, but make sure top slot has the larger number strip. Place one strip (Red OR Yellow) in the top slot and another lower numbered strip (Red, Yellow or Blue) in the second slot. Subtract the numbers that line up. **Note: See Note 2 in Addition above for teaching hints.** I refer to Subtraction as “Reverse Addition”

### **Division: (Red or Yellow)**

**Use one slot.** For simple division place one strip (Red or Yellow) in the top slot, find the small number strip, find the small number and the large number then count the number of places including them. *56 divided by 7* -- get the 7 strip, find the 7 and the 56, you count eight spaces so the answer is 8. For compound division place the small numbered strip in the slot and see if the big number is listed if not find the two numbers it is between on the strip and count to the lower of those two numbers. Next count from that number up to the original large number – that is your remainder. *96 divided by 9* -- get the 9 strip, find the 9 and look for the 96, you can't find 96 BUT you find 90 and 99, you count ten spaces to get 10. Count from 90 up to 96 to get the remainder of 6. Your answer is 10 with a remainder of 6 (10 r 6). **Note:** Post-its can be used to cover Teaching Strip numbers during classroom use to see if students are learning. I refer to Division as “Quick Subtraction, Power Subtraction OR Speed Subtraction”

### **Equivalent Fractions: (Red or Yellow)**

**Use two slots.** Place one strip (Red or Yellow) in the top slot (Numerator) and another strip (Red or Yellow) in the second slot (Denominator) and make sure they are lined up. The top and bottom numbers to the left are the lowest equivalents for those strips. Check the factor sheet to see if the lowest numbers have any similar factors. If so, reduce to the lowest equivalent fraction.

### **Adding Like Fractions: (Red and Yellow)**

**Use all four slots.**

Use strips (Red) in slots 1 and 2; Use strips (Yellow) in slots 3 and 4. Make sure that slots 2 and 4 (Denominator) have the same number strip (Common Denominator) ....(Red1, Yellow1), (Red2, Yellow2)...(Red25, Yellow25), etc.

Add the numbers in slots 1 and 3 (Numerator) above the same bottom number (Common Denominator). **Note:** If the Numerator is larger than the Denominator you will get an improper fraction and you have to follow the instructions for "**Improper Fractions'** .

### **Subtracting Like Fractions: (Red and Yellow)**

**Use all four slots.**

Similar to **Adding Like Fractions** but make sure the larger fraction is in the top slot. **Note:** If the Numerator is larger than the Denominator you will get an improper fraction and you have to follow the instructions for "**Improper Fractions'** .

### **Adding Unlike Fractions: (Red and Yellow)**

**Use all four slots.**

Use strips (Red) in slots 1 and 2; Use strips (Yellow) in slots 3 and 4. Look in slots 2 and 4 for the same number the closest to the left (Least Common Denominator).

Add the numbers in slots 1 and 3 (Numerator) above the same bottom number (Common Denominator). *Note:* If the Numerator is larger than the Denominator you will get an improper fraction and you have to follow the instructions for "**Improper Fractions**".

### **Subtracting Unlike Fractions: (Red and Yellow)**

**Use all four slots.**

Similar to **Adding Unlike Fractions** but make sure the larger fraction is in the top slot.

*Note:* If the Numerator is larger than the Denominator you will get an improper fraction and you have to follow the instructions for "**Improper Fractions**".

### **Mixed Fractions: (Red and Yellow)**

**Use three slots.**

Use strips (Red) in top slot for the whole number; Use strips (Yellow) in slots 3 and 4 for the fraction and it's equivalents.

### **Improper Fractions: (Red and Yellow)**

**Use three slots.**

Use strips (Yellow) in slots 3 and 4 for the fraction and it's equivalents (Yellow1 in slot 3). Place the same number strip (Red) in top slot as the strip in slot 4. Next, compare (Numerator) with top strip numbers. Find the number that matches the numerator or numbers it falls between. Count the number **of spaces** you moved from left to right. If your numerator isn't listed – use the number to the left. The number of spaces you count over is your whole number.

If the original numerator doesn't match your number then subtract it from the original numerator and count that many spaces over from the left on strip three for the fraction.

### **Fraction and Percentage Equivalents: (Multi-Colored)**

**Use two slots.**

Use strips (Multi-Colored1-Multi-Colored18) in slots 1 and 2. The fraction in slot 1. The color-coded matching percentage in slot 2. *Note:* All these strips are color-coded based on the equivalent fractions.

### **Fraction and Decimal Equivalents: (Multi-Colored)**

**Use two slots.**

Use strips (Multi-Colored1-Multi-Colored18) in slots 1 and 2. The fraction in slot 1. The color-coded matching decimal in slot 2. *Note:* All these strips are color-coded based on the equivalent fractions.

## **Fraction, Percentage and Decimal Comparison: (Multi-Colored)**

Use three or four slots.

Use strips (Multi-Colored 1-18) in slots 1, 2, 3 and 4. The fraction in slot 1. The color-coded matching percentage in slot 2, decimals and repeating decimals in slots 3 and 4.

*Note:* All these strips are color-coded based on the equivalent fractions. Decimals are rounded to 100ths and 1,000ths depending on the strip. You can also explain repeating values with the line above the digits on 1,000ths strips

## **Money Equivalents: (Green)**

Use three or four slots.

Similar to **Fraction, Percentage and Decimal Comparison** above.

Use strips (Green 1-32) in slots 1, 2, 3 and 4. The cent (¢) in slot 1. The dollar (\$) in slot 2. The Word and Percentage strips in slot 3. The Word and Decimal strips in slot 4.

## **Factor Strips: (Pink)**

Can be used as needed.

## **Positive and Negative Number Strips (Orange):**

Are Cut Vertically to understand the concept easier. They should be used with the Number Ladders. I like to think of mirrored positive and negative numbers as twins and the all positive and negative numbers are in two different teams that rarely get along.

Mirrored numbers are 1 and -1, 2 and -2, 6 and -6, etc. Think of twins that look alike and act completely different from one another. One belongs to the positive team the other to the negative team.

If you want to add them they want to subtract, If you want to subtract them then they want to add. When you multiply them your problems get more negative. If you divide them your problems get smaller.

Multiplying an even number of negative team mates together produces positive results. Multiplying an odd number of negative team mates together produces negative results. Same with Division.

## **Test Strips:**

Can be used as needed. They can be used as above. Red 1-7, Yellow 8-14, Blue 15-21 and Green 22-25.

The following math aids do not use the strips but, are concepts that may apply to your classroom or other learning environment.

**Place Value Houses**

**1-108 Factors Sheets**

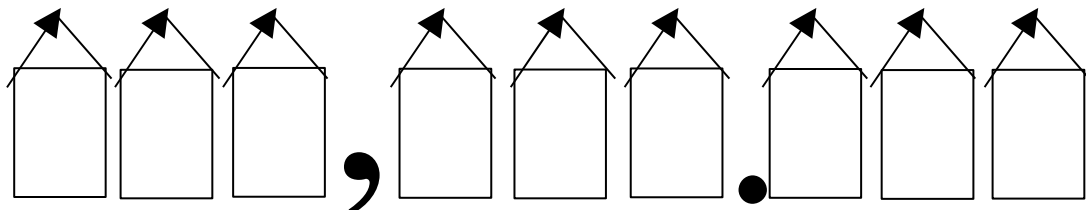
**Number Ladders**

**Software Programs**

**Place Value Houses:**

Are used to learn the concept of Place Values.

Think of math place values as houses on a street.

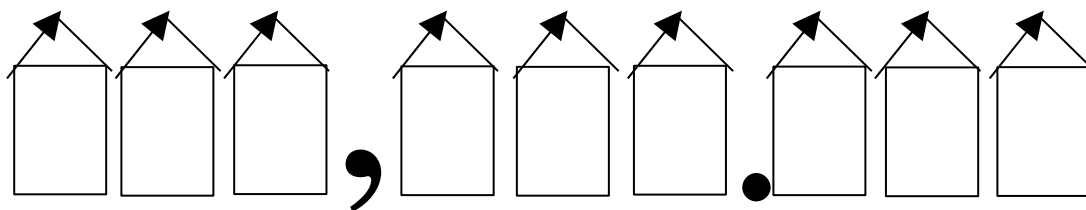


Hundred    Ten    Thousands    Hundreds    Tens    Ones    Tenths    Hundredths    Thousandths  
 Thousands    Thousands

A number lives in each house and has a different last name than the other houses. Their last name is written at the bottom of their house. Each house has nine family members named Nine (9), Eight (8), Seven (7), Six (6), Five (5), Four (4), Three (3), Two(2) and One (1). The Nine is the oldest and largest – The One the youngest and smallest. Only one number can come to the window at a time. In some houses – no one is home so their window shows a zero (0). Each “Block” is defined by a comma. Apartment houses are to the right of the period. (also called decimals or parts of a whole number). The Apartment houses DO NOT have any blocks between them (Commas).

Examples:

12.75                    8                    17                    123    10.639    1,250                    .54



**Place Value Houses Worksheet:**

Are used to practice the concept of Place Values.

**1-108 Factor and Prime Number Chart:**

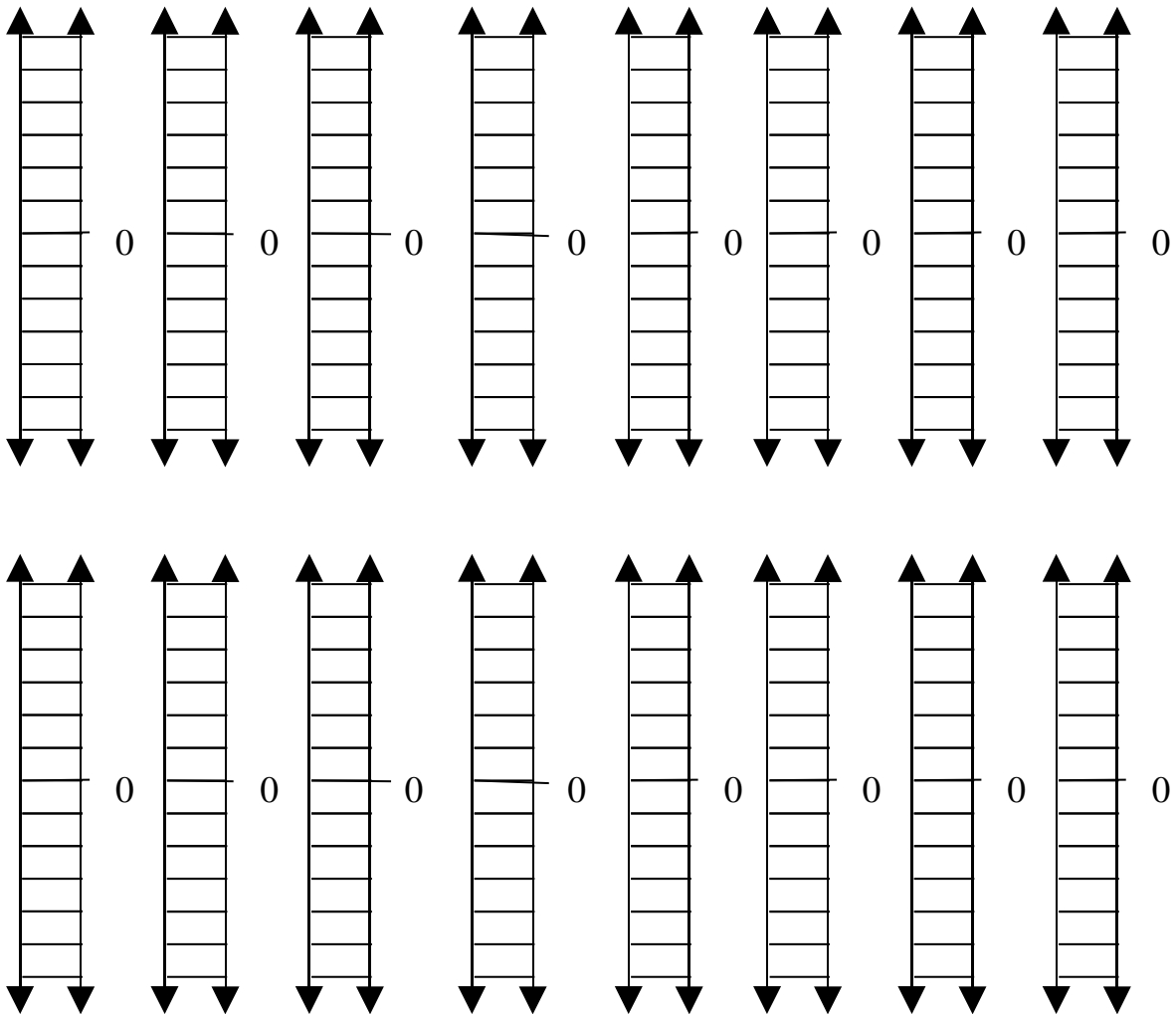
Can be used to teach factors, prime numbers and as an aid in learning to reduce fractions.

**1-108 Factor and Prime Number Worksheet:**

Can be used as a factor and prime number test and as an aid in learning factors.

**Number Ladders:**

Are used similar to number lines but are vertical so it's easier to understand positive and negative numbers.





## **Software Programs:**

The software programs use a spreadsheet format to self-check work. They can also be used to show pie chart equivalents, bar charts (not to scale) and equivalent Decimals and Percentages. They are aids for students and teachers.

### ***The Primary Elementary Software contains:***

**Addition and Subtraction** where you enter the two numbers and then find what they add up to or the difference between them which show up on charts.

and

**Multiplication and Division** where you enter the two numbers and then find what their product or the quotient of them which show up on charts.

### ***The Intermediate Elementary Software contains:***

**Learning One Fraction** with Pie Chart and Decimal Equivalent.

Enter smaller number on top, larger number on bottom then press "Enter"

**Adding Two Fractions** with color-coded Pie Chart

Enter Fraction Number One (RED) and Fraction Number Two (BLUE).

(Smaller numbers on top of each fraction). Press "Enter" **NOTE:** Both fractions added together CANNOT equal a number higher than 1.

**Equivalent Pies** Two fractions multiplied and divided up to 25 times out plus Decimal and Percentage comparisons. Pie charts for both fractions are displayed side by side Top Fraction in RED, Bottom Fraction in BLUE. Designed for fractions equaling a total of one or less.

If working with numbers bigger than one total, please use the Equivalent Bar Chart page. (Remember that the bars are NOT drawn to scale).

**Equivalent Bars** Two fractions multiplied and divided up to 25 times out plus Decimal and Percentage comparisons. Bar charts for both fractions are displayed. Top Fraction in BLUE and RED, Bottom Fraction in ORANGE and PURPLE. Designed for both proper and improper fractions. (Remember that the bars are NOT drawn to scale).

***Jr High Math Software contains:***

**Absolute Value** Enter a positive or negative number on top, press "Enter" Absolute Value of the number appears below.

**Powers/Exponents** Enter a positive or negative number on top, enter the power to be raised by, press "Enter". The result appears below the  $x^n$  box. You also get answers in the boxes under the  $x^{(-n)}$  box and  $x^{(1/n)}$  box, although those haven't been tested yet. The  $x^{(1/n)}$  only works for positive numbers.

**Squares/Cubes/Square Roots/Cube Roots/To Roman Numeral/To Binary/To Hexadecimal** Enter a number and press "Enter" The answers will appear under the specific boxes.

**From Roman Numeral To Arabic (Base Ten)** Enter a Roman Numeral and press "Enter" The answers will appear under the "Base 10" box.

**To and From Scientific Notation** Enter a number and press "Enter" The answer will appear under the "Scientific Notation" box and in the "Standard Notation" box.

**Miscellaneous Tests** Allows for testing of the different areas above.

**Positive and Negative Numbers** Enter a positive and a negative number and press "Enter". The following answers will appear: Addition, Subtraction, Multiplication and Division of those two numbers. The distance (or Range) between the two will also appear. Graphs help illustrate the number relationship.

## Conclusion

If you've read this far – It's the end of the manual! Why? I firmly believe that students should learn early on to create their own math problems using situations and things that are of interest to them. It creates a sense of ownership. It also makes them have to figure out how to make the problem work -- developing critical thinking skills. With tight school budgets, I also wanted something that was fairly inexpensive since so many cuts have been made already. If there is enough demand I will probably make something more hefty. If any of you want me to post ways you use the system or any way I can be of better help to our children (and other learners), or if you have questions – please email me at [jrguliz@yahoo.com](mailto:jrguliz@yahoo.com). I want your feedback and teaching questions and suggestions. I'd like to put them on line for others to implement at <http://www.angelfire.com/ia3/numbers>.

NOTE: All programs end with .ods, .odt, and .odg which are Open Office format. Open Office software is available at [www.openoffice.org](http://www.openoffice.org) To modify sheets use IAITNMS\_2 under Tools – Protect Sheet. Thank you.